

What is claimed is:

[Claim 1] A display comprising:

- a substrate;
 - a first fluid disposed adjacent the substrate, the first fluid absorbing at least one wavelength of light;
 - a light-transmissive second fluid immiscible with the first fluid;
 - at least one electrode for applying an electric field to the first fluid; and
 - a concealment member spaced from the substrate and formed from a substantially opaque material,
- such that, in the absence of an electric field, the first fluid covers a first area of the substrate, but that upon application of an electric field to the first fluid by the at least one electrode, the first fluid moves to a second area smaller than the first area and substantially confined between the concealment member and the substrate, so that the concealment member substantially conceals the first fluid from an observer viewing the display from the opposed side of the concealment member from the substrate.

[Claim 2] A display according to claim 1 wherein the substrate comprises a dielectric surface layer adjacent the first fluid.

[Claim 3] A display according to claim 1 wherein the substrate comprises a colored or reflective layer.

[Claim 4] A display according to claim 1 wherein the substrate has a substantially planar surface and the concealment member includes a substantially planar section extending substantially parallel to, but spaced from, the substantially planar surface of the substrate.

[Claim 5] A display comprising:

- a substrate having at least first and second portions having first and second optical characteristics differing from one another;
- a first fluid, the first fluid absorbing at least one wavelength of light and having a third optical characteristic differing from at least one of the first and second optical characteristics;
- a light-transmissive second fluid immiscible with the first fluid; and

a first electrode adjacent the first portion of the substrate and a second electrode adjacent the second portion of the substrate,

such that by controlling the potentials applied to the first and second electrodes, the first fluid can be made to assume a first position, wherein the first fluid substantially covers the second portion of the substrate, leaving the first portion uncovered, and a second position, wherein the first fluid substantially covers the first portion of the substrate, leaving the second portion uncovered.

[Claim 6] A display according to claim 5 wherein the first fluid can be made to assume a third position wherein it covers both the first and second portions of the substrate.

[Claim 7] A display according to claim 5 wherein the substrate has a third portion having an optical characteristic differing from the first, second and third optical characteristics, the display further comprising a third electrode adjacent the third portion of the substrate, such that by controlling the potentials applied to the first, second and third electrodes, the first fluid can be made to assume a third position, wherein the first fluid substantially covers at least one of the first and second portions of the substrate, leaving the third portion uncovered.

[Claim 8] A display according to claim 7 wherein the first, second and third portions of the substrate comprise a red portion, a green portion and a blue portion, or a yellow portion, a cyan portion and a magenta portion.

[Claim 9] A display according to claim 7 wherein the substrate has a fourth portion having an optical characteristic differing from the first, second and third optical characteristics and from the optical characteristic of the third portion of the substrate, the display further comprising a fourth electrode adjacent the fourth portion of the substrate, such that by controlling the potentials applied to the first, second, third and fourth electrodes, the first fluid can be made to assume a fourth position, wherein the first fluid substantially covers at least one of the first, second and third portions of the substrate, leaving the fourth portion uncovered.

[Claim 10] A display according to claim 9 wherein the first, second, third and fourth portions of the substrate comprise a red portion, a green portion, a blue portion, and a black portion, or a yellow portion, a cyan portion, a magenta portion and a black portion.

[Claim 11] A display according to claim 5 wherein the first and second portions of the substrate are coplanar.

[Claim 12] A display according to claim 5 wherein the first and second portions of the substrate have substantially the form of equilateral triangles.

[Claim 13] A display according to claim 5 wherein the first and second portions of the substrate have substantially the form of circles, the substantially circular first and second portions being connected by a neck section having a width smaller than the diameter of each substantially circular portion.

[Claim 14] A display according to claim 13 wherein an electrode is disposed on or adjacent the neck section.

[Claim 15] A display comprising:

- a first substrate through which an observer can view the display, a second substrate spaced from the first substrate and at least one sidewall extending between the first and second substrates, the first and second substrates and the sidewall together defining a chamber having a first substrate surface, a second substrate surface and at least one sidewall surface;

- a first fluid disposed within the chamber, the first fluid absorbing at least one wavelength of light;

- a light-transmissive second fluid immiscible with the first fluid and disposed within the chamber;

- a first electrode disposed adjacent the second substrate surface of the chamber;

- a second electrode disposed adjacent a sidewall surface of the chamber;
- and

- a third electrode extending into the chamber and in electrical contact with the second fluid,

such that, by controlling the potentials applied to the first, second and third electrodes, the first fluid can be made to assume a first position, wherein the first fluid lies adjacent the second substrate surface of the chamber, and a second position, wherein the first fluid lies adjacent a sidewall surface of the chamber.

[Claim 16] A display according to claim 15 wherein the second substrate comprises a dielectric surface layer adjacent the first fluid.

[Claim 17] A display according to claim 15 wherein the second substrate comprises a colored or reflective layer.

[Claim 18] A display according to claim 15 further comprising an insulator block disposed adjacent the junction between the second substrate surface and a sidewall surface of the chamber, wherein the third electrode passes through the insulator block.

[Claim 19] A display comprising:

- a fluid;

- a substrate having an exposed surface resistant to wetting by the fluid;

- at least three conductive vias extending through the substrate and terminating adjacent the exposed surface thereof; and

- cap members covering the ends of the conductive vias adjacent the exposed surface, the cap members being formed of a material wetted by the fluid.

[Claim 20] A display according to claim 19 wherein the conductive vias are arranged in a two-dimensional array.

[Claim 21] A display according to claim 19 wherein the fluid is aqueous, the exposed surface is hydrophobic and the cap members are formed of a hydrophilic material.

[Claim 22] A display comprising:

- a substrate;

- a first fluid disposed adjacent the substrate, the first fluid absorbing at least one wavelength of light;

a light-transmissive second fluid immiscible with the first fluid; and at least one electrode for applying an electric field to the first fluid, such that, in the absence of an electric field, the first fluid covers a first area of the substrate, but that upon application of an electric field to the first fluid by the at least one electrode, the first fluid moves to a second area smaller than the first area,

wherein the first fluid is colored with pigment particles or nanoparticles.

[Claim 23] A display comprising:

spaced first and second electrodes, the second electrode being light-transmissive;

first and second fluids confined between the first and second electrodes, the first and second fluids being immiscible with each other, the first and second fluids being non-light-transmissive and having differing colors,

the display having a first stable state wherein the first fluid lies adjacent the first electrode so that the color of the second fluid is visible to an observer viewing the display through the second electrode, and a second stable state wherein the first fluid lies adjacent the second electrode so that the color of the first fluid is visible to the observer.

[Claim 24] A display according to claim 23 wherein the first fluid comprises an oil and the second fluid is aqueous.

[Claim 25] A display according to claim 24 further comprising first and second dielectric layers disposed between the first and second electrodes respectively and the fluids.